

BIBLIOGRAPHY

- [1] Salem, L. Theory of Photochemical Reactions. *Science* **1976**, *191*, 822-830.
- [2] Chen, G.; Imanishi, Y.; Ito, Y. pH-Sensitive Thin Hydrogel Microfabricated by Photolithography. *Langmuir* **1998**, *14*, 6610-6612.
- [3] Revzin, A.; Russell, R. J.; Yadavalli, V. K.; Koh, W.-G.; Deister, C.; Hile, D. D.; Mellott, M. B.; Pishko, M. V. Fabrication of Poly(ethylene glycol) Hydrogel Microstructures Using Photolithography. *Langmuir* **2001**, *17*, 5440-5447.
- [4] Totzeck, M.; Ulrich, W.; Göhnermeier, A.; Kaiser, W. Pushing Deep Ultraviolet Lithography to its Limits. *Nat. Photonics* **2007**, *1*, 629-631.
- [5] Wallraff, G. M.; Hinsberg, W. D. Lithographic Imaging Techniques for the Formation of Nanoscopic Features. *Chem. Rev.* **1999**, *99*, 1801-1821.
- [6] Arnold, C. B.; Serra, P.; Piqué, A. Laser direct-write techniques for printing of complex materials. *MRS Bull.* **2007**, *32*, 23-31.
- [7] Deutsch, T. F.; Ehrlich, D. J.; Osgood, R. M. Laser photodeposition of metal films with microscopic features. *Appl. Phys. Lett.* **1979**, *35*, 175-177.
- [8] Tsao, J. Y.; Ehrlich, D. J. Patterned Photonucleation of Chemical Vapor-Deposition of Al by UV-Laser Photodeposition. *Appl. Phys. Lett.* **1984**, *45*, 617-619.
- [9] Rauh, R. D.; LeLievre, R. A. Microphotoelectrochemical Etching of n-GaAs Using a Scanned Focused Laser. *J. Electrochem. Soc.* **1985**, *132*, 2811-2812.
- [10] Attard, A. E.; Brown, D. E. Photoelectroplating Light Modulator. *Appl. Opt.* **1968**, *7*, 511-516.
- [11] Inoue, T.; Fujishima, A.; Honda, K. Photoelectrochromic Characteristics of Photoelectrochemical Imaging System with a Semiconductor/Solution (Metallic Ion) Junction. *J. Electrochem. Soc.* **1980**, *127*, 1582-1588.

- [12] Morishita, S. Photoelectrochemical Deposition of Copper on TiO₂ Particles. Generation of Copper Patterns without Photoresists. *Chem. Lett.* **1992**, *21*, 1979-1982.
- [13] Yoshihara, S.; Shinozaki, K.; Shirakashi, T.; Hashimoto, K.; Tryk, D. A.; Fujishima, A. Photoelectrodeposition of copper on boron-doped diamond films: application to conductive pattern formation on diamond. The photographic diamond surface phenomenon. *Electrochim. Acta* **1999**, *44*, 2711-2719.
- [14] Micheels, R. H.; Darrow, A. D.; Rauh, R. D. Photoelectrochemical deposition of microscopic metal film patterns on Si and GaAs. *Appl. Phys. Lett.* **1981**, *39*, 418-420.
- [15] Langille, M. R.; Personick, M. L.; Mirkin, C. A. Plasmon-Mediated Syntheses of Metallic Nanostructures. *Angew. Chem. Int. Ed.* **2013**, *52*, 13910-13940.
- [16] Grzelczak, M.; Liz-Marzán, L. M. The relevance of light in the formation of colloidal metal nanoparticles. *Chem. Soc. Rev.* **2014**, *43*, 2089-2097.
- [17] Gibbons, W. M.; Shannon, P. J.; Sun, S.-T.; Swetlin, B. J. Surface-Mediated Alignment of Nematic Crystals with Polarized Laser Light. *Nature* **1991**, *351*, 49-50.
- [18] Shannon, P. J.; Gibbons, W. M.; Sun, S.-T. Patterned Optical Properties in Photopolymerized Surface-Aligned Liquid-Crystal Films. *Nature* **1994**, *368*, 532-533.
- [19] Ichimura, K. Photoalignment of Liquid-Crystal Systems. *Chem. Rev.* **2000**, *100*, 1847-1873.
- [20] Barrett, C. J.; Nathansohn, A. L.; Rochon, P. L. Mechanism of Optically Inscribed High-Efficiency Diffraction Gratings in Azo Polymer Films. *J. Phys. Chem.* **1996**, *100*, 8836-8842.
- [21] Dasog, M.; Carim, A. I.; Yalamanchili, S.; Atwater, H. A.; Lewis, N. S. Profiling Photoinduced Carrier Generation in Semiconductor Microwire

- Arrays via Photoelectrochemical Metal Deposition. *Nano Lett.* **2016**, *16*, 5015-5021.
- [22] Kontoleta, E.; Askes, S. H. C.; Lai, L. H.; Garnett, E. C. Localized photodeposition of catalysts using nanophotonic resonances in silicon photocathodes. *Beilstein J. Nanotechnol.* **2018**, *9*, 2097-2105.
- [23] Hubert, C.; Rumyantseva, A.; Lerondel, G.; Grand, J.; Kostcheev, S.; Billot, L.; Vial, A.; Bachelot, R.; Royer, P.; Chang, S.-h.; Gray, S. K.; Wiederrecht, G. P.; Schatz, G. C. Near-Field Photochemical Imaging of Noble Metal Nanostructures. *Nano Lett.* **2005**, *5*, 615-619.
- [24] Hubert, C.; Bachelot, R.; Plain, J.; Kostcheev, S.; Lerondel, G.; Juan, M.; Royer, P.; Zou, S.; Schatz, G. C.; Wiederrecht, G. P.; Gray, S. K. Near-Field Polarization Effects in Molecular-Motion-Induced Photochemical Imaging. *J. Phys. Chem. C* **2008**, *112*, 4111-4116.
- [25] Plain, J.; Wiederrecht, G. P.; Gray, S. K.; Royer, P.; Bachelot, R. Multiscale Optical Imaging of Complex Fields Based on the Use of Azobenzene Nanomotors. *J. Phys. Chem. Lett.* **2013**, *4*, 2124-2132.
- [26] Ishitobi, H.; Nakamura, I.; Kobayashi, T.-a.; Hayazawa, N.; Sekkat, Z.; Kawata, S.; Inouye, Y. Nanomovement of Azo Polymers Induced by Longitudinal Fields. *ACS Photonics* **2014**, *1*, 190-197.
- [27] Jin, R.; Cao, Y. C.; Hao, E.; Métraux, G. S.; Schatz, G. C.; Mirkin, C. A. Controlling anisotropic nanoparticle growth through plasmonic excitation. *Nature* **2003**, *425*, 487-490.
- [28] Maillard, M.; Huang, P.; Brus, L. Silver Nanodisk Growth by Surface Plasmon Enhanced Photoreduction of Adsorbed $[Ag^+]$. *Nano Lett.* **2003**, *3*, 1611-1615.
- [29] Paul, A.; Kenens, B.; Hofkens, J.; Uji-i, H. Excitation Polarization Sensitivity of Plasmon-Mediated Silver Nanotriangle Growth on a Surface. *Langmuir* **2012**, *28*, 8920-8925.

- [30] Shell, G. S. G.; Lang, A. R. G. Description of Leaf Orientation and Heliotropic Response of Sunflower Using Directional Statistics. *Agric. Meteorol.* **1975**, *15*, 33-48.
- [31] Ehleringer, J.; Forseth, I. Solar Tracking by Plants. *Science* **1980**, *210*, 1094-1098.
- [32] Thanisawanyangkura, S.; Sinoquet, H.; Rivet, P.; Cretenet, M.; Jallas, E. Leaf Orientation and sunlit leaf area distribution in cotton. *Agric. For. Meteorol.* **1997**, *86*, 1-15.
- [33] Shell, G. S. G.; Lang, A. R. G.; Sale, P. J. M. Quantitative Measures of Leaf Orientation and Heliotropic Response in Sunflower, Bean, Pepper, and Cucumber. *Agric. Meteorol.* **1974**, *13*, 25-37.
- [34] Garrey, W. E. Light and the Muscle Tonus of Insects. The Heliotropic Mechanism. *J. Gen. Physiol.* **1918**, *1*, 101-125.
- [35] Loeb, J.; Northrop, J. H. Heliotropic Animals as Photometers on the basis of the validity of the Bunsen-Roscoe Law for Heliotropic Reactions. *Proc. Natl. Acad. Sci. U. S. A.* **1917**, *3*, 539-544.
- [36] Li, C.; Liu, Y.; Huang, X.; Jiang, H. Direct Sun-Driven Artificial Heliotropism for Solar Energy Harvesting Based on a Photo-Thermomechanical Liquid-Crystal Elastomer Nanocomposite. *Adv. Funct. Mater.* **2012**, *22*, 5166-5174.
- [37] Deng, J.; Li, J.; Chen, P.; Fang, X.; Sun, X.; Jiang, Y.; Weng, W.; Wang, B.; Peng, H. Tunable Photothermal Actuators Based on a Pre-programmed Aligned Nanostructure. *J. Am. Chem. Soc.* **2016**, *138*, 225-230.
- [38] Vassalini, I.; Alessandri, I. "The phactalysts": carbon nanotube/TiO₂ composites as phototropic actuators for wireless remote triggering of chemical reactions and catalysis. *Nanoscale* **2017**, *9*, 11446-11451.
- [39] Palagi, S.; Mark, A. G.; Reigh, S. Y.; Melde, K.; Qiu, T.; Zeng, H.; Parmeggiani, C.; Martella, D.; Sanchez-Castillo, A.; Kapernaum, N.; Giesselmann, F.; Wiersma, D. S.; Lauga, E.; Fischer, P. Structured light

- enables biomimetic swimming and versatile locomotion of photoresponsive soft microrobots. *Nat. Mater.* **2016**, *15*, 647-653.
- [40] Tomlinson, P. B. *The Structural Biology of Palms*; Oxford University Press: New York, 1990.
- [41] Christie, J. M.; Murphy, A. S. Shoot phototropism in higher plants: New light through old concepts. *Am. J. Bot.* **2013**, *100*, 35-46.
- [42] Iwase, A.; Sakai, K.; Suzuki, A.; van Woesik, R. Phototropic adjustment of the foliaceous coral *Echinopora lamellosa* in Palau. *Estuar. Coast. Shelf Sci.* **2008**, *77*, 672-678.
- [43] Kaniewska, P.; Campbell, P. R.; Fine, M.; Hoegh-Guldberg, O. Phototropic growth in a reef flat acroporid branching coral species. *J. Exp. Biol.* **2009**, *212*, 662-667.
- [44] Hutchings, M. J.; de Kroon, H. Foraging in Plants: the Role of Morphological Plasticity in Resource Acquisition. In *Advances in Ecological Research*; Begon, M., Fitter, A. H., Eds.; Academic Press: London, 1994; Vol. 25, pp 159-238.
- [45] Slade, A. J.; Hutchings, M. J. The Effects of Light Intensity on Foraging in the Clonal Herb *Glechoma Hederacea*. *J. Ecol.* **1987**, *75*, 639-650.
- [46] Meier, M. C.; Cheng, W.-H.; Atwater, H. A.; Lewis, N. S.; Carim, A. I. Inorganic Phototropism in Electrodeposition of Se-Te. *J. Am. Chem. Soc.* **2019**, *141*, 18658-18661.
- [47] Sadtler, B.; Burgos, S. P.; Batara, N. A.; Beardslee, J. A.; Atwater, H. A.; Lewis, N. S. Phototropic growth control of nanoscale pattern formation in photoelectrodeposited Se-Te films. *Proc. Natl. Acad. Sci. U. S. A.* **2013**, *110*, 19707-19712.
- [48] Tan, C.; Qin, C.; Sadtler, B. Light-directed growth of metal and semiconductor nanostructures. *J. Mater. Chem. C* **2017**, *5*, 5628-5642.
- [49] Yin, A. J.; Li, J.; Jian, W.; Bennett, A. J.; Xu, J. M. Fabrication of Highly Ordered Metallic Nanowire Arrays by Electrodeposition. *Appl. Phys. Lett.* **2001**, *79*, 1039.

- [50] Sander, M. S.; Prieto, A. L.; Gronsky, R.; Stacy, A. M. Fabrication of High-Density, High Aspect Ratio, Large-Area Bismuth Telluride Nanowire Arrays by Electrodeposition into Porous Anodic Alumina Templates. *Adv. Mater.* **2002**, *14*, 665-667.
- [51] Choi, K.-S.; Lichtenegger, H. C.; Stucky, G. D.; McFarland, E. W. Electrochemical Synthesis of Nanostructured ZnO Films Utilizing Self-Assembly of Surfactant Molecules at Solid-Liquid Interfaces. *J. Am. Chem. Soc.* **2002**, *124*, 12402-12403.
- [52] Choi, K.-S. Shape Control of Inorganic Materials via Electrodeposition. *Dalton Trans.* **2008**, 5432-5438.
- [53] Xiao, Z.-L.; Han, C. Y.; Kwok, W.-K.; Wang, H.-H.; Welp, U.; Wang, J.; Crabtree, G. W. Tuning the Architecture of Mesostructures by Electrodeposition. *J. Am. Chem. Soc.* **2004**, *126*, 2316-2317.
- [54] Siegfried, M. J.; Choi, K.-S. Elucidating the Effect of Additives on the Growth and Stability of Cu₂O Surfaces via Shape Transformation of Pre-Grown Crystals. *J. Am. Chem. Soc.* **2006**, *128*, 10356-10357.
- [55] Liu, R.; Vertegel, A. A.; Bohannon, E. W.; Sorenson, T. A.; Switzer, J. A. Epitaxial Electrodeposition of Zinc Oxide Nanopillars on Single-Crystal Gold. *Chem. Mater.* **2001**, *13*, 508-512.
- [56] Carim, A. I.; Hamann, K. R.; Batara, N. A.; Thompson, J. R.; Atwater, H. A.; Lewis, N. S. Template-Free Synthesis of Periodic Three-Dimensional PbSe Nanostructures via Photoelectrodeposition. *J. Am. Chem. Soc.* **2018**, *140*, 6536-6539.
- [57] Hamann, K. R.; Carim, A. I.; Meier, M. C.; Thompson, J. R.; Batara, N. A.; Yermolenko, I. S.; Atwater, H. A.; Lewis, N. S. Optically tunable mesoscale CdSe morphologies via inorganic phototropic growth. *J. Mater. Chem. C* **2020**, 12412-12417.
- [58] Carim, A. I.; Batara, N. A.; Premkumar, A.; Atwater, H. A.; Lewis, N. S. Self-Optimizing Photoelectrochemical Growth of Nanopatterned Se-Te

Films in Response to the Spectral Distribution of Incident Illumination.

Nano Lett. **2015**, *15*, 7071-7076.

- [59] Carim, A. I.; Batara, N. A.; Premkumar, A.; Atwater, H. A.; Lewis, N. S. Polarization Control of Morphological Pattern Orientation During Light-Mediated Synthesis of Nanostructured Se-Te Films. *ACS Nano* **2016**, *10*, 102-111.
- [60] Carim, A. I.; Batara, N. A.; Premkumar, A.; May, R.; Atwater, H. A.; Lewis, N. S. Morphological Expression of the Coherence and Relative Phase of Optical Inputs to the Photoelectrodeposition of Nanopatterned Se-Te Films. *Nano Lett.* **2016**, *16*, 2963-2968.
- [61] Hamann, K. R.; Carim, A. I.; Meier, M. C.; Lewis, N. S. Path-Dependent Morphological Evolution of Se-Te Mesostructures Prepared by Inorganic Phototropic Growth. *J. Am. Chem. Soc.* **2020**, *142*, 19840-19843.
- [62] Carim, A. I.; Meier, M. C.; Kennedy, K. M.; Richter, M. H.; Hamann, K. R.; Lewis, N. S. Assessing Effects of Near-Field Synergistic Light Absorption on Ordered Inorganic Phototropic Growth. *J. Am. Chem. Soc.* **2021**, *143*, 3693-3696.
- [63] Hale, G. M.; Querry, M. R. Optical Constants of Water in the 200-nm to 200- μ m Wavelength Region. *Appl. Opt.* **1973**, *12*, 555-563.
- [64] Brueck, S. R. J.; Ehrlich, D. J. Stimulated Surface-Plasma-Wave Scattering and Growth of a Periodic Structure in Laser-Photodeposited Metal Films. *Phys. Rev. Lett.* **1982**, *48*, 1678-1681.
- [65] Osgood, R. M.; Ehrlich, D. J. Optically induced microstructures in laser-photodeposited metal films. *Opt. Lett.* **1982**, *7*, 385-387.
- [66] Destouches, N.; Crespo-Monteiro, N.; Vitrant, G.; Lefkir, Y.; Reynaud, S.; Epicier, T.; Liu, Y.; Vocanson, F.; Pigeon, F. Self-organized growth of metallic nanoparticles in a thin film under homogeneous and continuous-wave light excitation. *J. Mater. Chem. C* **2014**, *2*, 6256-6263.
- [67] Sipe, J. E.; Young, J. F.; Preston, J. S.; van Driel, H. M. Laser-induced periodic surface structure. I. Theory. *Phys. Rev. B* **1983**, *27*, 1141-1154.

- [68] Young, J. F.; Preston, J. S.; van Driel, H. M.; Sipe, J. E. Laser-induced periodic surface structure. II. Experiments on Ge, Si, Al, and brass. *Phys. Rev. B* **1983**, *27*, 1155-1172.
- [69] Kildishev, A. V.; Boltasseva, A.; Shalaev, V. M. Planar Photonics with Metasurfaces. *Science* **2013**, *339*, 1232009.
- [70] Verslegers, L.; Catrysse, P. B.; Yu, Z.; White, J. S.; Barnard, E. S.; Brongersma, M. L.; Fan, S. Planar Lenses Based on Nanoscale Slit Arrays in a Metallic Film. *Nano Lett.* **2009**, *9*, 235-238.
- [71] Fattal, D.; Li, J.; Peng, Z.; Fiorentino, M.; Beausoleil, R. G. Flat Dielectric Grating Reflectors with Focusing Abilities. *Nat. Photonics* **2009**, *4*, 466-470.
- [72] Gansel, J. K.; Thiel, M.; Rill, M. S.; Decker, M.; Bade, K.; Saile, V.; von Freymann, G.; Linden, S.; Wegener, M. Gold Helix Photonic Metamaterial as Broadband Circular Polarizer. *Science* **2009**, *325*, 1513-1515.
- [73] Chen, Z.; Cummins, D.; Reinecke, B. N.; Clark, E.; Sunkara, M. K.; Jaramillo, T. F. Core-shell MoO₃-MoS₂ Nanowires for Hydrogen Evolution: A Functional Design for Electrocatalytic Materials. *Nano Lett.* **2011**, *11*, 4168-4175.
- [74] Kong, D.; Wang, H.; Lu, Z.; Cui, Y. CoSe₂ Nanoparticles Grown on Carbon Fiber Paper: An Efficient and Stable Electrocatalyst for Hydrogen Evolution Reaction. *J. Am. Chem. Soc.* **2014**, *136*, 4897-4900.